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A comparison of the health status and health care utilisation patterns between foreigners and the national population in Spain: new evidence from the Spanish National Health Survey

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Abstract

The reduction of inequalities in health and in the access to health services is one of the main objectives in any health care system. Various studies have analysed the existence of inequalities in health and in the use of health care for the Spanish population. However, the empirical evidence for the immigrant collective on this issue is as yet insufficient. This working paper aims to provide evidence on inequalities in health and in the access to health services for the immigrant population living in Spain, relative to that of the autochthonous population, by using the 2003 and 2006 Spanish National Health Survey. After using a pooled ordered probit for a measure of self-assessed health and pooled probit models for several utilisation variables, our results show that there are different patterns in health status and utilisation of health care between nationals and immigrants in Spain. Immigrants report better levels of health status than Spaniards, although they face barriers of entry to health care services. Health policies should focus on reducing legal, cultural and administrative barriers to access health services.

JEL codes: I12, C21

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1 Introduction

Immigration is a phenomenon relatively new, but with a growing importance in Spain. Considering the 1998-2007-time span, the proportion of foreigners registered in the census as a proportion of the total population has increased five-fold (see Figure 1.A), becoming the main receiving country of immigration flows in Europe[2].

Immigrants tend to concentrate in Balears, Comunidad Valenciana and Murcia, followed by Madrid and Cataluña. Extremadura and Asturias are the *Autonomous Communities* (ACs) where immigrants represent the lowest proportion of the population (see Figure 2.A). By nationality, Latin Americans are the most numerous, followed by citizens from the European Union and Africa (see Figures 3.A and 4.A).

The importance of the phenomenon of immigration for the health services is manifested in the approval of the *Law 4/2000 of 11th of January about rights and liberties of foreigners in Spain*, according to which all individuals, regardless of their nationality, should be entitled to use health care services with the same conditions as Spanish citizens. The only requisite for immigrants, whether legally accredited or not, to be able to access health care services in the same way as Spaniards is to be registered in the local population census. Immigrants who are not registered in the population census are only covered by emergency services. Children and pregnant women have full coverage irrespective of their legal and administrative situation (Durán, Lara and van Waveren, 2006). In addition, the government has recently approved the "Citizenship and Integration Strategic Plan 2007-2010" that targets the whole population, and intends to promote social cohesion through policies based on equality of opportunity and equality of rights and duties (Mladovsky, 2007). There are also Regional Immigration Plans in most of the Autonomous Communities which include as a priority the reduction of inequalities in health and in the access to health

[2] Data accessed on July 2008 from the Spanish National Statistics Institute ("*Foreign population by nationality, autonomous communities, age and sex*") and Eurostat ("*Net migrant flows in Europe*"). Available online at http://www.ine.es/jaxi/menu.do?type=pcaxis&path=/t20/e245/p05//a2007&file=pcaxis and http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=0&language=en&pcode=caa14608

services. However, these policies have been formulated without any sound scientific evidence that corroborates the existence of such inequalities.

Antecedents

High scale immigration started some decades ago in the US, Canada and in many Member States in the European Union. Their experience as immigration recipient countries has allowed them to specify the health care needs of their immigrant population and to collect representative data about this population group in their national health surveys. As a consequence, there is a great deal of literature on this issue for countries such as Canada and England (e.g.Gravelle, Morris and Sutton, 2006; McDonald and Kennedy, 2004; Smaje and Le Grand, 1995). In Spain, however, immigration and specially work-related immigration is a relatively new phenomenon and therefore, the studies about inequalities in health and equity in the utilization of the Spanish health care system for the immigrant population are as yet few.

For the specific case of Canada, McDonald and Kennedy (2004) use multiple cross-sections of the Population National Health Survey and the Canadian Community Health Survey in order to corroborate the phenomenon known as the "*healthy immigrant effect*", according to which the health status of recent immigrants is superior to that of the native population of the immigrant recipient countries. Their results point to the existence of the "*healthy immigrant effect*" for chronic conditions, but not for self-assessed health. In addition, the authors show that the probability of reporting a chronic condition by the immigrant population does not seem to be a consequence of a greater use of health services with the number of years since migration.

For the Spanish case, several studies have explored the existence of inequalities in health and inequity in the access to health care services for the Spanish population (e.g., Abásolo and Manning 2001; Clavero and González 2005; García and López 2004; 2007). However, only a few studies have analysed inequalities in health and health service utilisation of the immigrant population living in Spain.

Recently, Rivera et al (2008) exploit the Spanish National Health Survey (SNHS), the European Survey on Income and Living Conditions (EU-SILC) and the European

Community and Health Survey (ECHP) with the aim of comparing the patterns of health status and utilisation of health care services for the national and foreign population. The authors conclude that the epidemiological profile and the utilisation of health services of Spaniards and foreigners do not differ substantially.

Jiménez Rubio (2008) employs the 2003 Spanish National Health Survey to explore whether non-Spaniards, for the same level of need, use health care services at the same rate as national citizens. For visits to hospital emergency services, the study corroborates previous results for Catalonia which suggest that emergency care is an important mechanism of access to health services by immigrants. The results of the study also show that the immigrant population have a higher probability of being hospitalised, and a lower probability of visiting a specialist doctor, than the Spanish population with the same health and socioeconomic characteristics.

On the other hand, a study by Torres-Cantero et al (2007) analyses the utilisation level by illegal immigrants in Spain as a consequence of the law introduced in 2002 that allowed illegal immigrants free access to health services in similar terms than the legal migrants or the Spanish population. The study concludes that there are no important differences in use of health services between legal and illegal immigrants.

Finally, a national level study based on the 2003 Spanish National Health Survey (Carrasco-Garrido et al, 2007), explores the health status, life style and utilization of health care services for the immigrant population in Spain. Their findings show that, as compared to the Spanish population, immigrants present better parameters related to lifestyle than the ones of the national population, such as a lower consumption of alcohol and tobacco. As for the use of health care services, immigrants report high rates of hospitalisation. However, the study does not find evidence for an excessive or inappropriate use of health services.

Regarding regional level studies, García Gómez (2007) explores the differences in the access to health care services and the health status between immigrants and the Catalan population using data from the 2006 Catalan Health Survey. For self-assessed health, the findings show that immigrants are less likely to report bad physical health status, but are more likely to report bad mental health levels. With respect to the use of health services, the results of this study suggest that immigrants have a lower probability of visiting a

specialist doctor and a higher probability of visiting hospital emergency services than Spanish-born individuals, other factors equal. Since the differences in utilisation are reduced with the immigrants' number of years of residence in Catalonia, the study concludes that the different utilisation patterns between the native and the immigrant population might be due to a limited knowledge of the functioning of the Spanish health care system by immigrants.

Using data from hospital admissions at Hospital del Mar in Barcelona, Cots et al. (2002) find that immigrants have different needs than the Spanish population given their different age structure and their higher fertility rate. The analysis also shows that low income immigrants tend to access health care services primarily through the emergency department. In a more recent study, Cots et al. (2007) analysed hospital emergency visits at Hospital del Mar in Barcelona by the immigrant and Spaniard population. They find that immigrants tend to use hospital emergency services as a substitute for other health care services.

The empirical literature presented in this section has two important limitations. On the one hand, the studies using national level data are constrained by the small sample sizes for the immigrant population. On the other hand, the studies with sufficiently large sample sizes are based on data for Catalonia. This paper aims at contributing to the research literature about the health status and health care utilisation of immigrants in Spain using recently available nation-wide data. The data used corresponds to the 2003 and 2006 waves of the Spanish National Health Survey that in 2003 started collecting health-related information about foreigners living in Spain. Pooling the 2003 and 2006 waves of the SNHS will allow us to maximise the usable sample size for the immigrant population in Spain.

In particular, the objective of this paper is to use regression estimation techniques to explore how the patterns of health and health care utilisation compare between Spaniards and non Spaniards. In addition, we compute income related measures of inequality in health and inequity in health care use for our samples of autochthonous and immigrant populations to analyse whether there are differences in health or health care utilisation that can be attributed to differences in income levels in the two groups. The next section provides an overview of the methodology that we have followed in the estimations, while section 3 presents the data used. Section 4 discusses the results, distinguishing between the health and health care use specifications. Finally, section 5 concludes.

2 Methods

2.1 Empirical specification

For the purpose of our study, we apply different estimation techniques to our data, making a distinction between the self-reported health specification and the model specification for the utilisation variables.

Specification for modelling self-assessed health

For self-assessed health, we run an ordered probit model to explain a four-category measure of health status. Probit models assume normality and present a symmetric function, assuming that the error term is distributed normally, with zero mean and variance equal to one. We consider here a pooled specification for both years 2003 and 2006, applying the standard cross-section estimator. The log-likelihood used for the pooled model assumes that the observations are independent across waves and uses the product of their marginal distributions (Jones, 2000).

Our ordered probit specification presents a measurement model, in which a latent variable (h_i^*) is mapped to an observed variable (h_i), through the thresholds τ's.

The structural model, is given by the following expression:

$$h_i^* = \alpha + \beta \ln inc_i + \sum_k \gamma_k x_{k,i} + \varepsilon_i, \text{ with i} = 1, ..., \text{N} \quad (1)$$

In (5), h_i^* represents a latent variable representation of the observed level of health limitations; $\ln inc_i$ is the logarithm of the equivalised net household income, $x_{k,i}$ is a vector of socioeconomic and demographic variables and ε_i reflects the individual error term. In our data, the latent outcome h_i^* is not observed. Instead, we observe a categorical measure of health in which the latent indicator falls (h_i). The mechanism of observation (measurement model) is the following:

$$h_i = \begin{cases} 1, \text{if } -\infty \le \mathrm{h}_\mathrm{i}^* < \tau_1 \\ 2, \text{if } \tau_1 \le \mathrm{h}_\mathrm{i}^* < \tau_2 \\ 3, \text{if } \tau_2 \le \mathrm{h}_\mathrm{i}^* < \tau_3 \\ 4, \text{if } \tau_3 \le \mathrm{h}_\mathrm{i}^* < \infty \end{cases} \quad (2)$$

Specification for modelling health care use

Assuming a linear model, the utilisation of health services can be explored by regressing medical care use (y_i) on income, a vector of k medical need indicator variables (x_k), and a set of p non-need variables (z_p) using the equation:

$$y_i = \alpha + \beta * \ln(inc_i) + \sum_k \gamma_k x_{k,i} + \sum_p \delta_p z_{p,i} + \varepsilon_i \quad (3)$$

Need variables are those that ought to affect the use of health care, whereas non-need variables are those that ought not to affect current health care use. In spite of the substantial debate on the meaning of need and the value judgements involved in distinguishing between need and non-need variables (Gravelle, Morris, and Sutton, 2006), we follow the standard approach in the empirical literature and use morbidity variables (proxied by health status and health limitations) as need indicators, and variables such as income, education, AC of residence (as a proxy for availability of care), tenure of private insurance, and nationality, as non-need indicators.

Because health care use variables are discrete and non-normally distributed, linear (OLS) estimation methods are in general not appropriate for the regression specified in equation (3), and non-linear methods are required in order to obtain efficient estimations and appropriate predictions (Wooldridge, 2006). For modelling health care utilisation we run pooled probit regressions collapsing 2003 and 2006 SNHS data. Assuming that y_i in equation (3) above is a latent variable (y*), the probit model can be written as:

$$y_i = \begin{cases} 1 \text{ if } y_i^* > 0 \\ 0, \text{ otherwise} \end{cases} \quad (4)$$

We estimated the pooled probit regression models for our health and health care use variables using STATA 9.0. Individual weights (provided by the SNHS) were used in all computations in order to make the results representative for the Spanish population. Also, a year dummy for 2006 was included in the estimations to take into account the possibility that the 2003 and 2006 samples are independent.

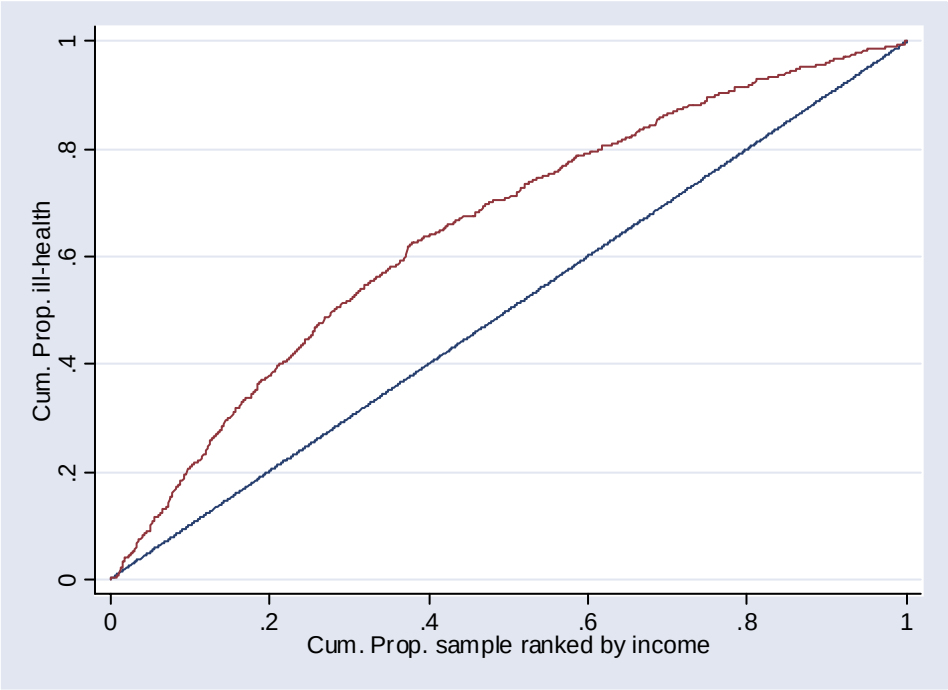
2.2 Socioeconomic inequalities in health and inequities in the use of health care: the Concentration Index

Methods based on concentration curves and concentration indices have been extensively used for measuring inequalities and inequities (Wagstaff and van Doorslaer, 2000). The health concentration curve (CC) and concentration index (CI) provide measures of relative income-related health inequality (Wagstaff, Van Doorslaer and Paci, 1989). Wagstaff, Paci and van Doorslaer (1991) have reviewed and compared the properties of the concentration curves and indices with alternative measures of health inequality. They argue that the main advantages are that: they capture the socioeconomic dimension of health inequalities; they use information from the whole income distribution rather than just the extremes; that they give the possibility of visual representation through the concentration curve, and finally, they allow checks of dominance relationships.

The concentration index (CI) is derived from the concentration curve (CC). This is illustrated in Figure 1 for a measure of ill-health. The sample of interest is ranked by socioeconomic status. So, if income is used as the relevant ranking variable, the horizontal axis begins with the poorest individual and progresses through the income distribution up to the richest individual. This relative income rank is then plotted against the cumulative proportion of illness on the vertical axis. This assumes that a cardinal measure of illness is available, that can be compared and aggregated across individuals. The 45-degree line shows the line of perfect equality, along which the population shares of illness are proportional to income, such that the poorest 20% of individuals experience 20% of the illness in the population. "Pro-poor" inequality is illustrated by the concave curve in the figure which corresponds to the concentration curve. In the example shown, the poorest 20% of income earners experience more than 20% of illnesses. The size of inequality can

be summarised by the health concentration index, which is given by twice the area between the concentration curve and the 45-degree line.

Figure 1: Concentration curve for ill-health



There are various ways of expressing the CI algebraically. The one that is most convenient for our purposes is:

$$CI^t = \frac{2}{\mu}\text{cov}\left(h_{it}, R_i^t\right) \tag{5}$$

This shows that the value of the concentration index is equal to the covariance between individual health (h_i) and the individual's relative rank (R_i), scaled by the mean of health in the population (μ). Then the whole expression is multiplied by 2, to ensure the concentration index ranges between -1 and +1. Equation (5) indicates that the CI is a measure of the degree of association between an individual's level of health and their relative position in the income distribution.

Together with the CI for our measure of health limitations, we calculate a CI of the need-standardised use for health care (HI), which measures the degree of horizontal inequity in

health care (van Doorslaer, Masseria et al, 2004). When HI equals zero, there is horizontal equity. Positive values of the HI measure indicate pro-rich inequity, while negative values of the HI measure indicate pro-poor inequity. Assuming a linear model, need-standardised use can be calculated by indirect standardisation as the difference between actual utilisation (y_i) and need-expected utilisation ($\hat{y}_i^x$), plus the sample mean (y^m):

$$\hat{y}_i^{IS} = y_i - \hat{y}_i^X + y^m \tag{6}$$

The computation of the need-predicted values of utilisation ($\hat{y}_i^x$) requires two steps. Firstly, we run a regression of medical care use (y_i) on (the logarithm of) income, a vector of k medical need indicator variables (x_k), and a set of p non-need variables (z_p), using the following equation:

$$y_i = \alpha + \beta \ln inc_i + \sum_k \gamma_k x_{k,i} + \sum_p \delta_p z_{p,i} + \varepsilon_i \,, \tag{7}$$

Secondly, we combine the coefficients from the OLS estimations with actual values of the x_k variables –the need variables for which we want to standardise- and sample means of the income and z_p variables -the non-need variables for which we do not want to standardise, but for which we want to control in the estimation of the coefficients-, using the need-prediction equation:

$$\hat{y}_i^X = \hat{\alpha} + \hat{\beta} \ln inc^m + \sum_k \hat{\gamma}_k x_{k,i} + \sum_p \hat{\delta}_p z_p^m \,, \tag{8}$$

where $\hat{y}_i^x$ indicates the amount of medical care an individual would have received if he had been treated as others with the same need characteristics, on average.

To compute need-standardised use we employ standard OLS models (see, e.g. Van Doorslaer et al., 2004; García and López, 2007). Although non linear models have certain advantages over standard OLS modelling techniques, calculation of equation (6) would involve a re-linearization by using either the marginal or average effects of each independent variable treated as fixed parameters and evaluated at the mean (or some other parameter). The disadvantage of this procedure is that the standardisation holds only

approximately, and is contingent on the values used for the evaluation. In addition, previous research shows that horizontal inequity measures calculated by standard OLS techniques hardly differ to those obtained by non linear methods (Van Doorslaer et al., 2000).

3 The data

3.1 Spanish National Health Survey

In this study we use the 2003 and 2006 waves of the Spanish National Health Survey. The Spanish National Health Survey (hereafter SNHS) is a representative survey of the Spanish population. It is disseminated every two years and it is coordinated by the Ministry of Health and Consumption. The sampling of the data follows a three-stage stratified design. The units of the first stage are the census sections. The units of the second stage are the main family households. Within each household, an adult (16 or older) is selected to fill all the questionnaires. The SNHS includes a wide variety of information about health and socioeconomic conditions of Spanish residents and it contains individualised samples for adults and children.

For the purpose of this work, we restrict attention to the adult samples of the 2003 and 2006 waves of the SNHS. Previous waves of this survey (1987, 1991, 1993, 1997, 2001) do not allow us to identify the nationality or the country of birth of the respondent. Since 2003, the SNHS includes a variable related to the nationality of the respondents and in the last wave corresponding to 2006, information on the country of birth is included. In addition, the SNHS for both the 2003 and 2006 waves includes information about visits to hospital emergency services, a variable which is not usually included in other health surveys (e.g. Spanish sample from the ECHP). This information will allow us to corroborate with recent Spanish nation-wide data the findings of previous studies suggesting that hospital emergency services are an important mechanism of access to the health system by immigrants in Spain (ej. Cots et al. 2007; García Gómez 2007; Jiménez Rubio 2008).

3.2 Sample and variables

We use an unbalanced sample of respondents, including all the individuals aged 16 years or older interviewed in each wave. Table 1 shows the sample size for our dataset split by nationality –our proxy for immigrant status- and gender.

Table 1. Sample sizes for 2003 and 2006 SNHS

	2003	2006	Total 2003-2006
All	21,650	29,478	51,128
Men	9,875	11,645	21,520
Women	11,755	17,833	29,608
Nationals	21,000	27,381	48,381
Men	9,580	10,747	20,327
Women	11,420	16,634	28,054
Immigrants	650	2,055	2,705
Men	295	878	1,173
Women	355	1,177	1,532

The SNHS includes several indicators of health status, together with variables related to the respondents' utilisation of health care services. In addition, a wide set of demographic and socioeconomic variables, including lifestyle variables, can be found in the SNHS for both years.

Health status variables

We use self-assessed health (SAH) as our dependent variable in the health status model. Although the SNHS includes several measures of health status, SAH is our preferred one as it is the most extensively used measure of health in the research literature and it has been shown to be a strong predictor of subsequent use of health care services (van Doorslaer et al., 2000) and mortality (Idler and Kasl, 1995). For measuring individual's self perceived health status, individuals are asked: "In the last twelve months, would you say that your health state has been: very good, good, fair, poor, very poor?. From this original SAH variable, we construct a variable with four categories, collapsing the two lowest categories (poor and very poor) into one category (Hernández-Quevedo et al, 2008).

For explaining health care utilisation, we include self-assessed health and three other measures of health as a proxy for the need of health care use. The first is based on the question "Do you have any difficulty in carrying out your daily activities?, with four possible answers: 1. No limitations, 2. Moderate limitations, 3. Severe limitations. The second need variable employed is based on the question: "Did you have to reduce or limit your main activity during the last two weeks?" (no, yes). The last health status indicator employed in the study of health care utilisation is an indicator of whether the individual suffered an accident of any kind, including intoxication or burnt, during the twelve months previous to the survey.

Health care utilisation variables

The use variables that we consider are different indicators of whether the individual has visited: the GP, the specialist, hospital services and hospital emergency services.

Measurement of the utilisation of the general practitioner (GP) and medical specialist services is based on the question: "During the last two weeks (four weeks in the 2006 SNHS), about how many times have you visited: (a) a family doctor or general practitioner and (b) a medical specialist?". Hospital utilisation is measured on the basis of the question: "How many times in the past 12 months have you (a) been a patient overnight in a hospital and (b) visited hospital emergency services? . The different recall periods for utilisation of a GP and a specialist doctor in the 2003 and 2006 surveys imply that we will not be able to make predictions of use for each type of service. However, we can provide some insights from the sign of the estimated coefficients.

Socioeconomic variables

Several variables have been included in the econometric estimations to reflect both the demographic and socioeconomic characteristics of the individual.

Age and gender have been included in the specifications, where age is captured by the five dummy variables, that reflect the age interval that characterises the individual (age 16-34, 35-44, 45-64, 65-74 and over 75 years). We allow for the interaction between age and sex variables. 16-34 year old males are the reference category.

Income is used as the ranking variable when calculating the concentration indices, but it is also included as an explanatory variable in the econometric specification of both models that explain health limitations and utilisation of health services by the Spanish population. In the SNHS, income is measured as a categorical variable with 8 possible response categories that provide us with an estimate of the aggregate monthly income, after taxes and deductions, of all household members from all sources. Given the high proportion of missing values for income in the SNHS (25% in the 2003 wave and 11% in the 2006 wave), we have imputed household income by regressing the lower and upper bounds of each income interval on a set of variables related to the household, such as region of residence, number of children and number of adults and the mean age of adults, together with several variables related to the main earner of the household, such as education, activity and socioeconomic position (Álvarez, 2001; Jones, 2000). In addition to increasing the sample size, the use of an interval regression has allowed us to convert the categorical income values into continuous ones, a transformation which is particularly useful for the purpose of computing the CI. We have included non-response dummies in the estimations to allow for the possibility that items were not missing at random (Morris, Sutton and Gravelle, 2003). Equivalent income has been computed by using the modified OECD equivalence scale that takes into account differences in the size and composition of the families[3].

Other socioeconomic variables used in this study for both specifications of health limitations and use of health care are: AC of residence, job status, level of education and nationality of the respondents. We have included a dummy variable for each AC, except for the base category, Comunidad de Madrid, to allow for cultural and geographical differences in the distribution of health and use of health services among Spanish regions. Given their different status, Ceuta and Melilla have been excluded from the analysis, and instead, restricted attention has been devoted to the seventeen Spanish ACs. For education, we use four levels: no education, primary and secondary (first cycle) studies, secondary (second cycle) and post-secondary studies, and university studies (reference category). Job status is measured by six dummy variables that describe the activity status of the respondents: employed (base category), unemployed, retired, student, housework and other. In this study

[3] The modified OECD scale assigns a weight of 1.0 to the first adult household member, 0.5 to the second adult household member and 0.3 to children, being calculated as:

Equivalent income = ((income)/(1+0.5*(householdsize – 1 – number of children) + 0.3*children))

we have used nationality as a proxy for immigrant status. Nationality is captured by the following dummy variables: Spain (reference category), European Union, other European country, Canada or USA, Latin America, Asia, Africa and Oceania. Table 2 shows the number of individuals corresponding to the different categories of nationality included in the 2003 and the 2006 waves of the SNHS. After Spaniards, nationals from Central and South America are the most numerous, followed by European Union citizens, Africans and Europeans (from non European Union countries). Asian, Australasian and North American are the less representative nationalities in the survey.

Table 2. Number of immigrants by nationality

	Total 2003-2006		**2003**		**2006**	
Nationality	**N**	**%**	**N**	**%**	**N**	**%**
Latin America	1,250	46	281	43	969	47
European Union	742	28	144	22	598	29
Africa	446	17	127	20	319	16
Europe	150	6	70	11	80	4
Asia	76	3	24	4	52	3
North America	24	1	3	0,5	21	1
Oceanía	8	0.3	1	0.2	7	0.3
Non Spaniards	**2,705**	**5**	**650**	**3**	**2,055**	**7**
Spaniards	**48,381**	**95**	**21,000**	**97**	**27,381**	**93**

Other individual characteristics

There are additional variables that have been included in the different specifications. In the self-reported health model, three indicators of lifestyle have been included. These are: whether the individual smokes, an indicator of whether the individual practices physical exercise and whether the respondent consumes alcohol regularly.

For the specification of the models of health care utilisation, we have included an indicator of whether the individual has private health insurance. Given that the type of health insurance may have an important effect on the length of time an individual has to wait to

receive health care assistance, we have included a dummy variable taking the value one if the individual has private coverage for health care services, irrespectively of whether he has purchased the insurance himself, or the state or a private company has contracted it on his behalf[4]. The fact that the tenure of a private insurance is not always an individual's choice but is based on the individual's occupation, implies that endogeneity in this context is less likely to be an issue.

4 Results

4.1 Descriptive statistics

Table 3 shows the mean statistics of the key (dependent) health status and health care use variables used in the estimations. According to Table 3, there are differences in the proportion of individuals reporting good or very good health and using health care services between Spanish nationals and non-nationals[5]. Non Spaniards report better level of health than Spaniards, a higher use of hospital emergency services, and a lower use of specialised care as compared to Spanish population. The next section explores whether these differences persist after controlling for all those factors that are known to affect health care use.

Table 3. Sample means of key health status and health care use variables

	2003			2006		
	All	**Spaniard**	**Non Spaniard**	**All**	**Spaniard**	**Non Spaniard**
Good or very good health	0.65	0.64	0.77	0.62	0.61	0.72
GP visits	0.24	0.25	0.15	0.84	0.84	0.85
Specialist visits	0.07	0.07	0.05	0.41	0.41	0.38
Hospital visits	0.11	0.10	0.12	0.10	0.10	0.08
Hospital emergency visits	0.27	0.26	0.29	0.29	0.29	0.31

[4] In Spain, civil servants have the possibility to opt out between the National Health Service or private insurance companies (WHO, 2006).

[5] Sample means reported in Table 3 are for a binary measure of being in good or very good health and indicators of whether the individual has visited at least once any of the health services considered in this study. Detailed sample means for self-assessed health categories can be found in Table 1A.

Sample means of the independent variables included in the regression models are presented in Table 1A of the Appendix. According to the sample descriptives, non-Spaniard individuals report higher levels of education compared to Spanish citizens. Further, there are relatively more non-Spaniards employed, in the working age and in the middle income categories. The socioeconomic characteristics of immigrants, and in particular their similar distribution by income level to the Spanish population, and their high proportion in the upper income interval, suggest that the non Spaniard sample might be capturing to a great extent immigration of wealthy individuals for non economic reasons such as retiring, rather than immigration of individuals moving to Spain in search for work. Regarding lifestyle variables, there is a higher proportion of national individuals who smoke and consume alcohol, while the proportion of individuals who practice physical activities is relatively higher for Spaniards than for non-Spaniards.

4.2 Regression results for econometric models of health status and health care use

4.2.1 Health status

The estimated coefficients of the probit models for health and health care use for the immigrant categories employed in the estimations are presented in Tables 4 to 6. Regression results for the remaining control variables used in the econometric estimations are presented in Tables 3A to 5A in the Appendix. Table 4 shows that after controlling for a set of socioeconomic and demographic variables, being immigrant is still statistically significant in explaining health status and it is negatively related to reporting low categories of health. Hence, immigrants are more likely to report the highest categories of self-assessed health.

Regarding the socioeconomic variables, Table 3A shows that for all specifications of SAH, there is a gradient for age, with individuals reporting worse levels of health as the individual gets older. The marginal effects for female individuals are greater than for male individuals, hence, reporting worse health. For level of education, it is also possible to see a gradient, with individuals with higher level of education reporting better levels of health than those with lower levels of education. Regarding activity status, those retired and inactive are the individuals more likely to report the lower categories of SAH. Students are more likely to report higher categories of SAH than the employed individuals.

Table 4. Results for the pooled probit analysis: coefficients for non Spaniards

	Self-assessed health		GP visits		Specialist visits		Hospital visits		Hospital emergency visits	
Nationality	Coef.	z	Coef.	Z	Coef.	z	Coef.	z	Coef.	z
Non Spaniard	-0.02***	-2.8	0.04**	2.4	-0.03***	-4.6	0.02***	2.9	0.02***	2.6
Pseudo R^2	0.1		0.3		0.2		0.1		0.2	
Log-L	-32,920		-14,947		-11,405		-13,792		-24,407	
N	31,101		32,829		32,646		49,123		49,123	

Note: The asterisks indicate significance at the 1% level (***) 5% level (**) and 10% level (*)

Table 6. Results for the pooled probit analysis: coefficients for non Spaniard nationalities

Nationality	**Self-assessed health**	**GP visits**	**Specialist visits**	**Hospital visits**	**Hospital emergency visits**
Latin America	0.001 (0.2)	0.05** (2.4)	-0.03*** (-3.4)	0.02*** (3.1)	0.07*** (5.8)
European Union	-0.05*** (-3.3)	0.07** (2.2)	-0.05*** (-4.3)	-0.002 (-0.2)	-0.04** (-2.4)
Africa	-0.03* (0.2)	0.04 (1.2)	-0.02 (-0.9)	0.05*** (3.6)	0.04* (1.9)
Europe	-0.03 (-1.6)	-0.16*** (-3.3)	0.04 (0.9)	-0.02 (-1.0)	-0.08*** (-2.6)
Asia	-0.01 (-0.4)	1.0 (1.4)	-0.01 (-0.4)	0.04 (1.4)	-0.02 (-0.5)
North America	-0.08 (-1.0)	-0.35*** (-12.1)	0.04 (0.3)	-0.07*** (-4.2)	-0.1 (-1.4)
Oceania	0.34* (1.7)	-0.30* (-1.9)	-0.03 (-0.2)	0.08 (0.6)	-0.16 (-1.4)
Pseudo R^2	0.1	0.3	0.2	0.1	0.2
Log-L	-32,904	-14,935	11,404	-13,779	-24,384
N	31,101	32,830	32,649	49,124	49,124

Note: The asterisks indicate significance at the 1% level (***) 5% level (**) and 10% level (*)

Table 5 indicates that being an European Union immigrant is statistically significant in explaining health status at any conventional significance level, while being an immigrant either from Africa or Oceania is statistically significant at a 10% significance level, *ceteris paribus*. Immigrants from the European Union tend to report higher categories of self-assessed health status, while those from Africa and Oceania tend to report worse levels of health than the nationals.

Table 7. Results for the pooled probit analysis, including interactions between income and non-Spaniards

	Self-assessed Health		GP visits		Specialist visits		Hospital visits		Hospital emergency visits	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	Z
Non-Spaniard* Income (ln)	-0.004***	-2.9	0.04	1.1	-0.03	-1.1	-0.10***	-7.3	-0.06**	-2.3
Pseudo R^2	0.1		0.3		0.2		0.1		0.2	
Log-L	-32,885		-14,946		-11,405		-13,765		-24,405	
N	31,101		32,829		32,646		49,123		49,123	

Note: The asterisks indicate significance at the 1% level (***) 5% level (**) and 10% level (*)

In order to analyse whether the differences in health or utilisation of health care are systematically associated to income, we have introduced a third model including an interaction term between income and being non Spaniard. For the SAH model, in Table 6, we can see that the interaction between being immigrant and level of income is statistically significant and negatively associated with health status. This means that the gap in health status between immigrants and non immigrants increases with the level of income (Wooldridge, 2006).

4.4.2. Health care utilisation

The regression results in Tables 4A and 5A in the Appendix show that need is the most important determinant of health care use. Overall, the estimated coefficients on the need variables have the expected sign. For instance, relative to being in very good health, being in very bad health increases the probability of using every type of health service considered in this study. In general, the coefficients for the variable self-assessed health also show the

expected gradient. Also, an interesting result indicates that 16-34 years old females have a higher probability of contacting a GP, a specialist doctor, and being hospitalized than their male counterparts, possibly indicating the use of maternity related services by healthy women. However, other non-need factors were also found to be important determinants of health care utilisation, including the nationality of an individual. As found in previous research using Spanish data (García and López, 2007), income is positively associated with the probability of contacting a specialist, while negatively associated with the probability of a GP visit. However, interestingly, our results suggest that higher income individuals have a higher probability of visiting emergency medical attention. The tenure of a private insurance increases as expected the probability of paying a visit to the specialist doctor and of being hospitalised, and reduces the probability of visiting the GP. The impact of the nationality of an individual on health care use across nationalities and types of health care is described in more detail below.

GP visits

According to the results Latin American and European Union individuals report a higher probability of a GP visit than a Spaniard, while nationals from Europe, North America and Oceania report a lower probability of visiting the GP. In particular, Latin Americans have a probability 0.05 greater of contacting a GP than a Spaniard individual with the same socio economic and health characteristics.

Specialist visits

In general, non Spaniards have a lower probability of visiting a specialist physician than Spanish individuals. By nationality, the analysis reveals that Latin Americans and citizens from the European Union have a lower probability of contacting a specialist. For European Union citizens for example the probability of a visit is 0.05 lower than for a Spanish individual with the same level of need.

Inpatient stays

For non-national individuals the results reveal a higher probability to spend a night in a hospital as compared to a Spanish citizen. Among non Spaniards, the probability of being

hospitalised is larger for Latin Americans and Africans. For Latin Americans for example the probability of an inpatient stay is 0.02 greater than for a Spaniard, holding all other factors equal. However, North Americans report a lower probability of an inpatient stay relative to a Spaniard individual.

Hospital emergency services

According to the results presented in Table 4 non Spaniards have a higher probability of using hospital emergency services. In particular, the results show that Latin Americans and Africans have higher probabilities of an emergency visit as compared to Spaniards, while citizens from the European Union and Europe report lower probabilities of visiting hospital emergency services. These results corroborate the previous findings suggesting that emergency services are an important mechanism of access to hospital services by immigrants, and are in line with previous research for Catalonia (Cots, Castells, García, Riu, Felipe, and Vall 2007; García Gómez 2007).

In sum, the results for health care use indicate that relative to Spaniards, immigrants report higher probabilities of contacting a GP, a hospital, and hospital emergency services, and a lower probability of visiting a specialist doctor. However, according to the results presented in Table 7, the different pattern of hospital utilisation between Spaniards and non Spaniards tend to diminish as the level of income increases.

4.3 Socioeconomic inequalities in health outcomes and utilisation

Table 2.A shows the results for the Concentration Indices of our measure of health, together with the CI of the need-standardised use for health care, this is, our measure of Horizontal Inequity. This has been calculated for both years and both national and non-national individuals. Figures 2, 3 and 4 show similar results for self-assessed health and utilisation variables, presenting the 95% confidence interval of the concentration indices.

Figure 2. CI for SAH for 2003 and 2006

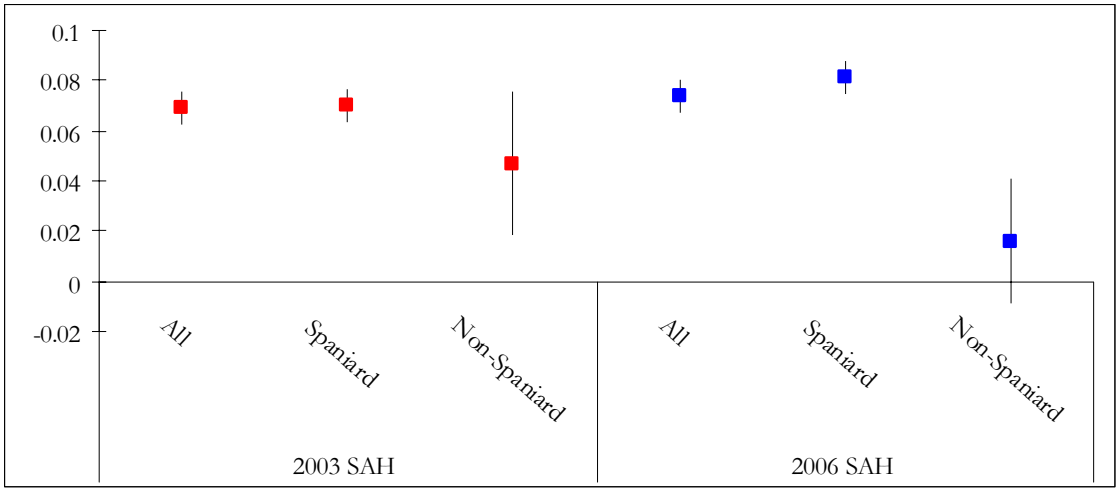


Figure 3. CI of the need-standardised use for health care for 2003

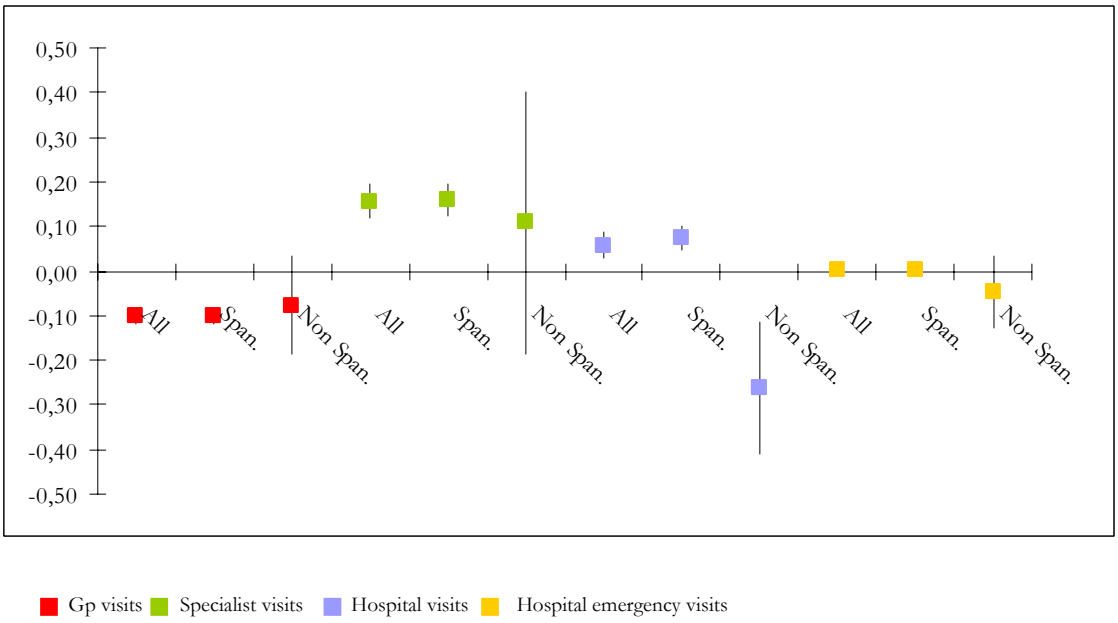
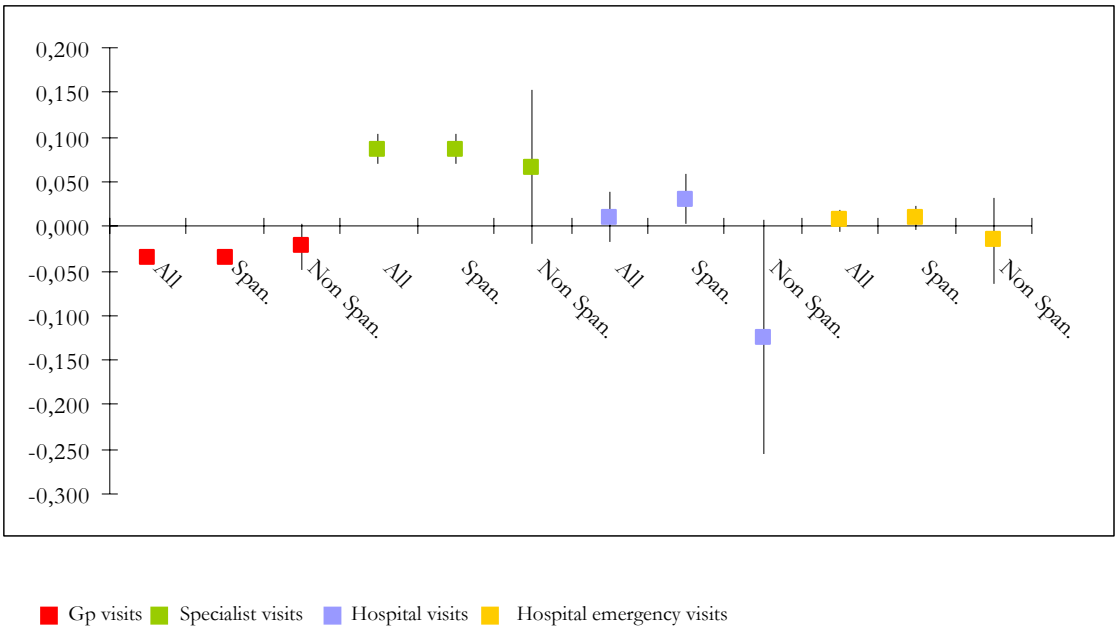


Figure 4. CI of the need-standardised use for health care for 2006



The results in Table 2A and Figure 2 show that all concentration indices for self-assessed health are positive, implying the existence of income-related inequalities in health for both nationals and immigrants. These inequalities favour rich individuals, so that richer individuals tend to report higher categories of health than the poor individuals. This pro-rich inequality in health is greater for nationals than for immigrants, for both periods, although immigrants show lower inequality in 2006 while nationals concentrate more inequalities in 2006 than in 2003.

For health care utilisation, the results corroborate previous studies for Spain (e.g. García and López, 2007; Van Doorslaer et al., 2004), in that the distribution of need-standardised hospital visits and specialist care is pro-rich, while the distribution of need-standardised GP visits is pro-poor. However, our results reveal some interesting differences for the inequity measures between Spaniards and non Spaniards. Firstly, for GP visits and specialist medical attention, the findings show that for immigrants income does not lead to substantial differences in utilization for the same level of need. Secondly, for non Spaniards income related inequities in the use of hospital services are much more concentrated on the poor than for Spaniards, especially for the year 2003. These results are consistent with our

previous findings shown in Table 7, and indicate that only for hospital services the differences in the patterns of utilisation between Spaniards and autochthonous population are associated with income.

5 Discussion

The reduction of inequalities in health and in the access to health services is one of the main objectives in any health care system. Economists have developed empirical methods that allow to quantify the degree of inequality in the distribution of health measures and health care utilisation, and compare inequalities over time and space, identifying those factors that lead to inequalities, being able to provide some evidence to policymakers. Various studies have analysed the existence of inequalities in health and in the use of health care for the Spanish population. However, the empirical evidence for the immigrant collective on this issue is as yet insufficient.

This working paper aims to provide evidence on inequalities in health and in the access to health services for the immigrant population living in Spain, relative to that of the autochthonous population, by using recent nation wide data from the Spanish National Statistics Institute.

In order to analyse any differences in health outcomes for the national and immigrant population, we focus on a measure of self-reported health that is available in the Spanish National Health survey. The main objective is to find the relationship between socioeconomic and demographic variables on the level of reported health and check weather the pattern is significantly different for immigrant individuals. Results show that reporting worse health is related to lower levels of education, being retired or inactive, getting older, while those with higher levels of income tend to report higher categories of self-perceived health. For the specific case of immigrants, we find that foreigners tend to report better levels of self-assessed health than nationals. In particular, those individuals from the European Union tend to report higher level of health than the national population.

In the analysis of the differences in the health care utilisation patterns by nationality groups attention is drawn to whether, after having controlled for need variables (proxied by

morbidity variables), utilisation of a GP, a specialist doctor, inpatient and hospital emergency services vary according to the nationality of the respondents. Other non-need variables included in the study are: income, education, Autonomous Community of residence, tenure of private health insurance and economic status. Utilisation of health care services is analysed using probit regression models.

The results indicate that need is the most important predictor of the probability of using any of the health care services analysed in this study. However, other non-need factors were found to be statistically significant in predicting individual utilisation of health services, including the nationality of the respondent.

The results for our health care utilisation variables reveal that immigrants are more likely to be treated in a hospital than Spaniards are, and they are more likely to contact a GP and emergency medical services. For specialist visits the findings indicate that foreigners are less likely to contact a specialist doctor than national citizens. Since under utilisation of specialist care services does not appear to be caused by a reluctance to seek an initial contact with the GP, these results may be taken to imply the existence of inequity in the access to specialist care with respect to nationality. Regarding emergency visits, the findings suggest that immigrants have a higher probability of contacting hospital emergency services as compared to Spaniards. As suggested by previous research for Catalonia, this result may reflect a limited understanding of the functioning of the Spanish health care system by immigrants, and a potential substitution of specialised care by hospital emergency services.

In addition, we have calculated measures of income related inequality in health and inequity in health care utilisation based on the Concentration Index to explore whether the observed differences in our key health and health care related variables are systematically associated with income.

For self assessed health, we found evidence of income-related inequalities in health for both nationals and immigrants, favouring the richest individuals. Nationals concentrate higher levels of health than immigrants for the two periods considered, although immigrants show lower income related inequality in 2006 while nationals concentrate more income related inequalities in 2006 than in 2003.

For health care utilisation our results show that only for hospital visits the differences found in the distribution of the need standardised probability of use between Spaniards and non Spaniards are related to income. In particular, according to our findings, the distribution of the probability of visiting a hospital is much more pro-poor than for Spaniards. For the remaining use variables income does not appear to lead to substantial differences in the probability of utilization for the same level of need.

Overall, our findings indicate that immigrants in Spain have different health and health care utilisation patterns than Spanish population. While immigrants report better levels of health status than Spaniards, our results suggest that non Spaniards face substantial barriers of entry to health care services. Our results imply that health policies should focus on improving immigrants' knowledge of the system by reducing legal, cultural and administrative barriers to access health services. Further understanding of the nature of these barriers (demand related: culture, language command, socio economic context or legal status; supply related: accessibility, staff attitudes), would help to target resources better to population needs and therefore ensure more effective health policies.

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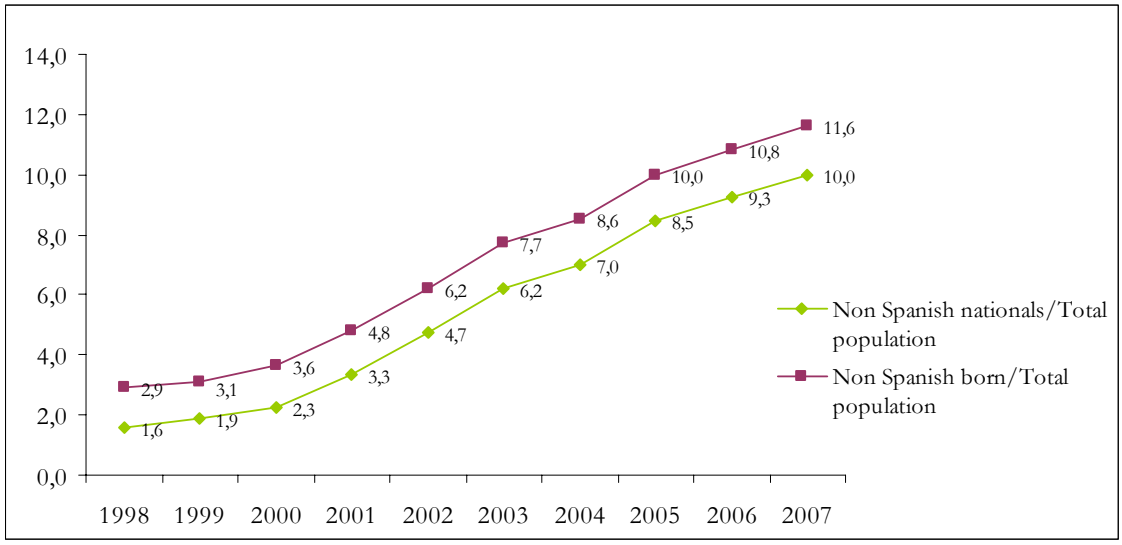
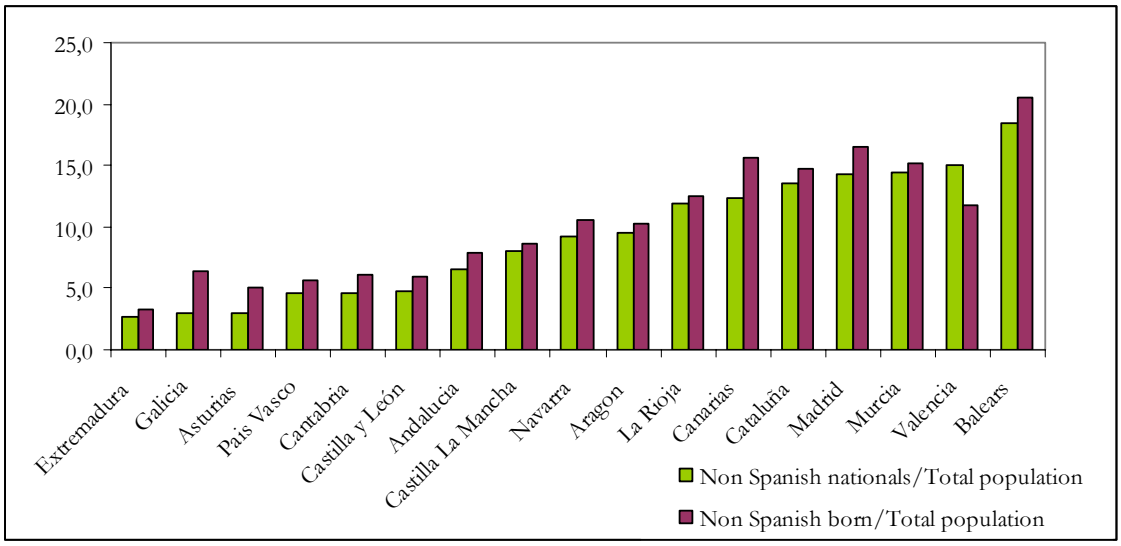
APPENDIX

Figure 1A. Proportion of foreign population on total population, 1998-2007



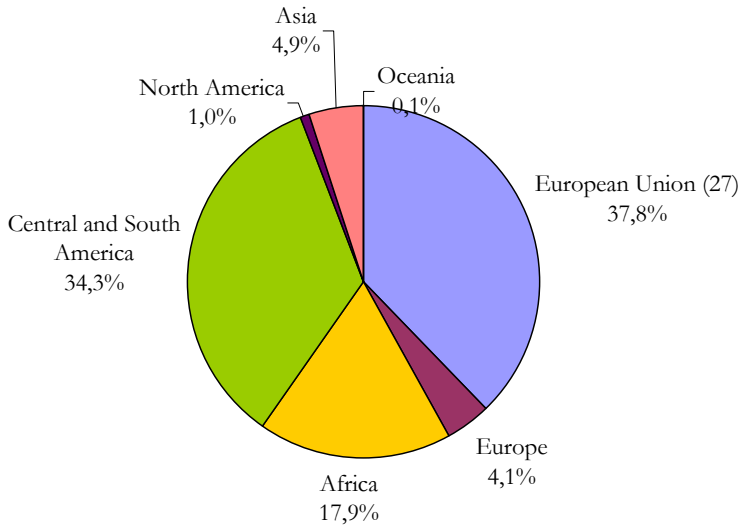
Source: Own calculations from Spanish National Statistics Institute data

Figure 2A. Proportion of foreign population on total population by Autonomous Communities, 2007



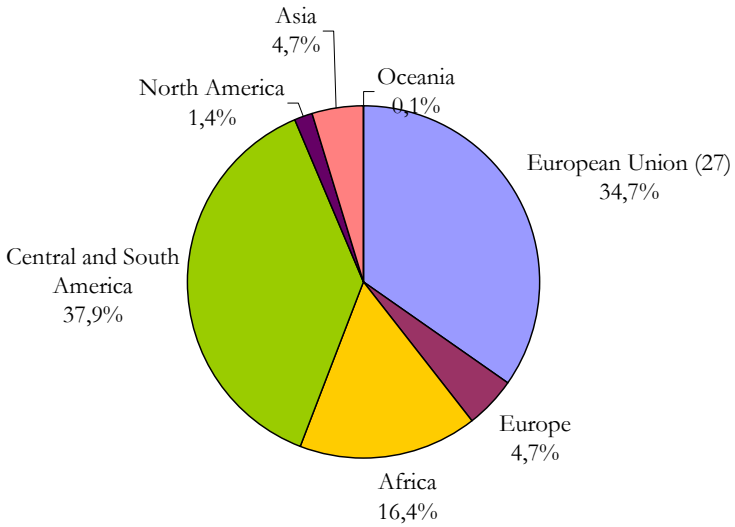
Source: Own calculations from Spanish National Statistics Institute data

Figure 3A. Foreign population classified by nationality group, 2007



Source: Own calculations from Spanish National Statistics Institute data

Figure 4A. Foreign population classified by country of birth, 2007



Source: Own calculations from Spanish National Statistics Institute data

Table 1A. Sample means of key variables

	Average 2003-2006			2003			2006		
Income	**All**	**Spaniards**	**Non Spaniards**	**All**	**Spaniards**	**Non Spaniards**	**All**	**Spaniards**	**Non Spaniards**
< 360 euros	0.021	0.021	0.016	0.026	0.027	0.018	0.017	0.017	0.016
361-600 euros	0.143	0.147	0.070	0.184	0.185	0.114	0.118	0.123	0.058
601-900 euros	0.171	0.171	0.174	0.201	0.199	0.263	0.152	0.153	0.151
901-1200 euros	0.203	0.200	0.260	0.199	0.198	0.237	0.205	0.201	0.266
1201-1800 euros	0.236	0.234	0.262	0.213	0.213	0.210	0.250	0.248	0.276
1801-3600 euros	0.192	0.193	0.182	0.152	0.153	0.132	0.217	0.219	0.195
3601-6000 euros	0.030	0.030	0.028	0.021	0.021	0.016	0.036	0.036	0.031
> 6000 euros	0.004	0.004	0.007	0.004	0.004	0.009	0.005	0.004	0.007
Self-reported health									
Very good	0.121	0.116	0.203	0.093	0.091	0.152	0.141	0.135	0.221
Good	0.512	0.511	0.534	0.556	0.554	0.618	0.480	0.478	0.505
Fair	0.266	0.268	0.219	0.254	0.256	0.191	0.274	0.278	0.229
Bad	0.078	0.080	0.035	0.076	0.077	0.035	0.079	0.083	0.034
Very bad	0.024	0.025	0.009	0.021	0.022	0.003	0.026	0.027	0.011
Limitations main activity (previous 2 weeks)									
Limited	0.147	0.148	0.129	0.133	0.134	0.102	0.157	0.158	0.138
Non limited	0.853	0.852	0.871	0.867	0.866	0.898	0.843	0.842	0.862
Limitations in daily activities									
Severe	0.044	0.046	0.014	0.033	0.034	0.008	0.053	0.055	0.017
Moderate	0.150	0.152	0.099	0.065	0.066	0.015	0.212	0.218	0.128
None	0.806	0.802	0.887	0.902	0.900	0.977	0.735	0.726	0.855
Accident	0.102	0.103	0.084	0.101	0.102	0.094	0.103	0.104	0.081
Age and sex									
16 to 34 years old male	0.107	0.101	0.218	0.121	0.117	0.235	0.097	0.088	0.212
35 to 44 years old male	0.092	0.090	0.126	0.102	0.102	0.117	0.084	0.080	0.130
45 to 64 years old male	0.122	0.125	0.074	0.126	0.128	0.080	0.119	0.122	0.072

65 to 74 years old male	0.054	0.057	0.013	0.061	0.062	0.015	0.049	0.052	0.012
> 75 years old male	0.046	0.048	0.007	0.046	0.047	0.006	0.046	0.049	0.007
16 to 34 years old female	0.127	0.118	0.291	0.125	0.121	0.274	0.128	0.116	0.297
35 to 44 years old female	0.109	0.108	0.132	0.097	0.096	0.123	0.118	0.116	0.134
45 to 64 years old female	0.170	0.173	0.116	0.144	0.145	0.115	0.189	0.194	0.116
65 to 74 years old female	0.088	0.092	0.012	0.093	0.095	0.015	0.084	0.089	0.011
> 75 years old female	0.086	0.090	0.011	0.084	0.086	0.018	0.086	0.092	0.008
Education									
None	0.143	0.147	0.080	0.148	0.149	0.105	0.139	0.145	0.071
Primary and secondary (cycle 1)	0.483	0.490	0.365	0.509	0.514	0.352	0.463	0.471	0.369
Secondary (cycle 2) and postsecondary	0.229	0.220	0.378	0.205	0.201	0.329	0.246	0.235	0.395
University	0.146	0.143	0.177	0.137	0.135	0.214	0.152	0.150	0.164
Activity status									
Employed	0.439	0.427	0.659	0.423	0.417	0.618	0.450	0.434	0.674
Retired	0.250	0.261	0.050	0.247	0.252	0.072	0.252	0.268	0.043
Unemployed	0.063	0.061	0.089	0.063	0.062	0.082	0.063	0.060	0.092
Student	0.050	0.050	0.041	0.061	0.062	0.057	0.042	0.042	0.035
Housework	0.188	0.191	0.149	0.199	0.200	0.166	0.181	0.183	0.143
Other	0.010	0.010	0.012	0.007	0.007	0.005	0.013	0.012	0.014
Health insurance									
Private health insurance	0.145	0.146	0.117	0.131	0.131	0.125	0.155	0.158	0.114
Compulsory health insurance	0.997	0.998	0.969	0.996	0.997	0.966	0.997	0.999	0.970
Lifestyle variables									
Smoke	0.468	0.469	0.455	0.463	0.464	0.423	0.472	0.473	0.467
Physical activity	0.589	0.591	0.556	0.572	0.571	0.615	0.603	0.607	0.534
Alcohol consumption	0.440	0.445	0.331	0.557	0.558	0.541	0.187	0.192	0.123

Table 2A: Concentration Index for health status and utilisation of health care

	2003			2006		
	All	**Spaniard**	**Non Spaniard**	**All**	**Spaniard**	**Non Spaniard**
Very good/good health	0.07*** (20.9)	0.07*** (20.3)	0.05*** (3.33)	0.07*** (22.8)	0.08*** (24.2)	0.016 (1.3)
GP visits	-0.10*** (-11.7)	-0.10*** (-11.7)	-0.08 (-1.4)	-0.04*** (-10.9)	-0.04*** (-10.9)	-0.02* (-1.8)
Specialist visits	0.16*** (8.5)	0.16*** (8.5)	0.11 (0.7)	0.09*** (10.4)	0.09*** (10.3)	0.07 (1.5)
Hospital visits	0.06*** (4.1)	0.07*** (5.1)	-0.26*** (-3.6)	0.01 (0.7)	0.03** (2.2)	-0.13* (-1.9)
Hospital emergency visits	0.003 (0.4)	0.004 (0.6)	-0.05 (-1.2)	0.01 (1.0)	0.01 (1.5)	-0.02 (-0.7)

Note: The asterisks indicate significance at the 1% level (***) 5% level (**) and 10% level (*)

Table 3A. Marginal effects for pooled probit specification for SAH, including different definitions of immigrant

	Self assessed health		
	(1)	(2)	(3)
Income (ln)	-0.047***	-0.048***	-0.047***
Imputed income dummy	-0.004	-0.003	-0.003
Non-Spaniard * Income (ln)			-0.004
Age and sex			
35 to 44 years old male	0.019***	0.012***	0.019***
45 to 64 years old male	0.054***	0.031***	0.054***
65 to 74 years old male	0.028***	0.029***	0.029***
over 75 years old male	0.055***	0.056***	0.054***
16 to 34 years old female	0.008**	0.008**	0.008**
35 to 44 years old female	0.036***	0.036***	0.036***
45 to 64 years old female	0.097***	0.099***	0.097***
65 to 74 years old female	0.129***	0.131***	0.128***
Over 75 years old female	0.143***	0.145***	0.142***
Education			
Primary and secondary (cycle 1)	-0.051***	-0.052***	-0.051***
Secondary (cycle 2) and postsecondary	-0.074***	-0.075***	-0.073***
University	-0.085***	-0.087***	-0.085***
Activity status			
Retired	0.105***	0.107***	0.104***
Unemployed	0.022***	0.022***	0.021***
Student	-0.0241***	-0.024***	-0.023***
Housework	0.027***	0.029***	0.027***
Other	0.119***	0.122***	0.119***

Autonomous Community			
Andalucía	-0.006	-0006	-0.006
Aragón	-0.0001	0.001	-0.0003
Asturias	0.028***	0.288***	0.028***
Balears	0.016*	0.016*	0.016*
Canarias	0.029***	0.029***	0.028***
Cantabria	0.005	0.006	0.005
Castilla y León	-0.007	-0.007	-0.008
Castilla la Mancha	-0.003	-0.004	-0.005
Cataluña	0.005	0.005	0.004
Comunidad Valenciana	0.003	0.003	0.002
Extremadura	-0.001	-0.01	-0.002
Galicia	0.051***	0.052***	0.050***
Murcia	-0.01	-0.001	-0.001
Navarra	-0.001	-0.001	-0.001
País Vasco	0.005	0.005	0.005
La Rioja	-0.014*	-0.014	-0.014*
Lifestyle			
Smoking	0.017***	0.017***	0.016***
Physical Activity	0.015***	0.015***	0.014***
Consumes Alcohol	-0.011***	-0.011***	-0.010***
Nationality			
Non Spaniard	-0.023***		0.004
Latin America		0.001	
North America		-0.080	
European Union		-0.052***	
Africa		-0.030*	
Europe		-0.031	
Asia		-0.0137	
Oceania		0.344*	
Year 2006	0.003	0.003	0.003
Cut-points			
Cut1	-2.781	-2.765	-2.784
Cut2	-1.021	-1.005	-1.025
Cut3	0.035	0.052	0.032
Pseudo R^2	0.1	0.1	0.1
Log-L	-32,920	-32,904	-32,919
N	31,101	31,101	31,101

Note: The asterisks indicate significance at the 1% level (***) 5% level (**) and 10% level (*)

Table 4A. Marginal effects for pooled probit specification for GP and specialist services, including different definitions of immigrant

	Gp visits			Specialist visits		
	(1)	(2)	(3)	(1)	(2)	(3)
Income (ln)	-0.041**	-0.043**	-0.043***	0.052***	0.053***	0.054***
Imputed income dummy	-0.031***	-0.032***	-0.031***	-0.006	-0.006	-0.006
Non Spaniard* Income (ln)			0.046			-0.136
Self-reported health						
Good	0.044***	0.045***	0.044***	0.020***	0.020***	0.020**
Fair	0.161***	0.161***	0.161***	0.074***	0.074***	0.074***
Bad	0.169***	0.169***	0.168***	0.156***	0.156***	0.156***
Very bad	0.119***	0.119***	0.119***	0.179***	0.179***	0.180***
Limitations main activity	0.233***	0.233***	0.233***	0.057***	0.057***	0.057***
Limitations in daily activities						
Moderate	-0.086***	-0.085***	-0.086***	0.033**	0.031**	0.033**
Severe	-0.069***	-0.068***	-0.069***	0.029***	0.029***	0.029***
Accident	0.003	0.003	0.003	0.034***	0.034***	0.034***
Age and sex						
35 to 44 years old male	0.019	0.019	0.019	0.014	0.015	0.014
45 to 64 years old male	0.061***	0.062***	0.061***	0.034***	0.034***	0.034***
65 to 74 years old male	0.132***	0.133***	0.132***	0.013	0.013	0.013
> 75 years old male	0.201***	0.203***	0.201***	0.001	0.001	0.001
16 to 34 years old female	0.054***	0.055***	0.054***	0.056***	0.056***	0.056***
35 to 44 years old female	0.051***	0.051**	0.051**	0.052***	0.053***	0.052***
45 to 64 years old female	0.118***	0.119***	0.118***	0.031***	0.032***	0.032***
65 to 74 years old female	0.170***	0.170***	0.170***	-0.006	-0.006	-0.006
> 75 years old female	0.206***	0.207***	0.206***	-0.040***	-0.040***	-0.040***
Education						
None	0.082***	0.081***	0.082***	-0.026***	-0.026***	-0.026***
Primary and secondary (cycle 1)	0.047***	0.046***	0.047***	-0.016**	-0.016**	-0.016**
Secondary (cycle 2) and postsecondary	0.030***	0.029**	0.030***	-0.004	-0.003	-0.004
Activity status						
Retired	0.060***	0.061***	0.060***	0.034***	0.034***	0.035***
Unemployed	0.013	0.014	0.013	0.021**	0.021**	0.021**
Student	-0.022	-0.021	-0.022	-0.015*	-0.015*	-0.015*
Housework	0.038***	0.039***	0.038***	0.018***	0.017**	0.018***
Other	0.003	0.002	0.003	0.032	0.032	0.032
Autonomous Community						
Andalucía	0.034***	0.034***	0.034***	-0.009	-0.008	-0.008
Aragón	0.032	0.032	0.032	-0.006	-0.006	-0.006
Asturias	0.016	0.016	0.016	0.002	0.002	0.002
Balears	-0.017	-0.018	-0.017	-0.004	-0.004	-0.004
Canarias	0.005	0.006	0.005	0.031**	0.031**	0.031**
Cantabria	-0.101***	-0.101***	-0.101***	-0.011	-0.011	-0.011
Castilla y León	0.023	0.022	0.022	-0.023***	-0.023***	-0.023***
Castilla la Mancha	0.087***	0.088***	0.087***	-0.014	-0.013	-0.014
Cataluña	-0.068***	-0.068***	-0.068***	0.019***	0.018**	0.019***
Comunidad Valenciana	0.043***	0.043***	0.043***	0.005	0.005	0.005
Extremadura	0.020	0.020	0.019	-0.032***	-0.032***	-0.032***

Galicia	0.030*	0.030*	0.030*	-0.011	-0.011	-0.011
Murcia	0.054**	0.054**	0.054**	-0.014	-0.014	-0.014
Navarra	0.007	0.008	0.007	-0.004	-0.004	-0.004
País Vasco	-0.030*	-0.030*	-0.029*	0.016	0.016	0.015
La Rioja	0.031	0.033	0.031	0.003	0.003	0.002
Private health insurance	-0.084***	-0.084***	-0.084***	0.070***	0.071***	0.070***
Nationality						
Non Spaniard	0.037**		-0.225	-0.033***		0.197
Latin America		0.052**			-0.033***	
European Union		0.069**			-0.048***	
Africa		0.041			-0.017	
Europe		-0.164***			0.036	
Asia		0.097			-0.014	
North America		-0.351***			0.040	
Oceania		-0.303*			-0.027	
Year 2006	0.609***	0.608***	0.609***	0.292***	0.292***	0.292***
Pseudo-R^2	0.3176	0.3183	0.3177	0.2229	0.2231	0.2229
Log-L	-14,947.1	-14,934.6	-14,946.5	-11,405.3	-11,403.9	-11,404.7
N	32,829	32,830	32,829	32,646	32,649	32,646

Note: The asterisks indicate significance at the 1% level (***) 5% level (**) and 10% level (*)

Table 5A. Marginal effects for pooled probit specification for hospital and hospital emergency services, including different definitions of immigrant

	Hospital visits			Hospital emergency visits		
	(1)	(2)	(3)	(1)	(2)	(3)
Income (ln)	0.006	0.007	0.013**	0.021***	0.024***	0.025***
Imputed income dummy	0.005*	0.005*	0.005	-0.009	-0.008	-0.009
Non Spaniard*Income (ln)			-0.097***			-0.056**
Self-reported health						
Good	0.015***	0.015***	0.015***	0.061***	0.061***	0.061***
Fair	0.077***	0.076***	0.077***	0.213***	0.213***	0.213***
Bad	0.187***	0.187***	0.187***	0.373***	0.374***	0.373***
Very bad	0.237***	0.236***	0.238***	0.385***	0.386***	0.385***
Limitations main activity	0.031***	0.031***	0.031***	0.124***	0.124***	0.125***
Limitations in daily activities						
Moderate	0.105***	0.105***	0.105***	0.113***	0.111***	0.113**
Severe	0.068***	0.068***	0.068***	0.080***	0.080***	0.080***
Accident	0.045***	0.045***	0.045***	0.514***	0.513***	0.514***
Age and sex						
35 to 44 years old male	0.002	0.002	0.003	-0.043***	-0.043***	-0.043***
45 to 64 years old male	0.021***	0.022***	0.021***	-0.083***	-0.082***	-0.083***
65 to 74 years old male	0.042***	0.044***	0.042***	-0.059***	-0.059***	-0.059***
> 75 years old male	0.041***	0.042***	0.042***	-0.038**	-0.038**	-0.037**
16 to 34 years old female	0.066***	0.066***	0.066***	0.070***	0.070***	0.070***
35 to 44 years old female	0.017***	0.017***	0.017***	-0.050***	-0.051***	-0.050***
45 to 64 years old female	-0.020***	-0.019***	-0.020***	-0.107***	-0.106***	-0.106***
65 to 74 years old female	-0.012*	-0.010	-0.011*	-0.096***	-0.096***	-0.095***
> 75 years old female	-0.006	-0.004	-0.005	-0.106***	-0.106***	-0.106***
Education						

None	0.000	-0.002	-0.001	0.015	0.015	0.014
Primary and secondary (cycle 1)	0.000	-0.001	-0.001	0.022***	0.021***	0.021***
Secondary (cycle 2) and postsecondary	0.000	0.000	0.000	0.026***	0.026***	0.026***
Activity status						
Retired	0.022***	0.023***	0.023***	-0.016*	-0.014	-0.015*
Unemployed	0.016***	0.016***	0.016***	-0.002	-0.001	-0.002
Student	-0.041***	-0.041***	-0.041***	-0.002	-0.001	-0.002
Housework	0.035***	0.034***	0.036***	-0.001	0.000	-0.001
Other	0.014	0.014	0.013	-0.038*	-0.037*	-0.039*
Autonomous Community						
Andalucía	-0.015***	-0.014***	-0.014***	0.057***	0.060***	0.058***
Aragón	0.007	0.008	0.007	0.018	0.019	0.018
Asturias	-0.017**	-0.016**	-0.017**	0.003	0.004	0.003
Balears	0.009	0.009	0.010	0.062***	0.063***	0.063***
Canarias	-0.004	-0.004	-0.003	0.012	0.015	0.013
Cantabria	0.006	0.006	0.006	0.037*	0.039*	0.037*
Castilla y León	-0.003	-0.003	-0.002	0.007	0.009	0.007
Castilla la Mancha	-0.009	-0.008	-0.008	0.042***	0.045***	0.042***
Cataluña	0.002	0.001	0.003	0.054***	0.053***	0.054***
Comunidad Valenciana	-0.014***	-0.013***	-0.013***	0.030***	0.033***	0.030***
Extremadura	-0.011	-0.010	-0.009	0.055***	0.057***	0.056***
Galicia	-0.009	-0.008	-0.008	0.031***	0.033***	0.032**
Murcia	-0.003	-0.003	-0.003	0.059***	0.060***	0.059***
Navarra	-0.007	-0.007	-0.008	0.001	0.001	0.000
País Vasco	-0.002	-0.002	-0.002	-0.001	0.000	-0.001
La Rioja	-0.021*	-0.021*	-0.022*	-0.059**	-0.057**	-0.060**
Private health insurance	0.027***	0.028***	0.027***	-0.007	-0.006	-0.007
Nationality						
Non Spaniard	0.016***		0.959***	0.022***		0.449***
Latin America		0.024***			0.071***	
European Union		-0.002			-0.036**	
Africa		0.053***			0.038*	
Europe		-0.017			-0.081***	
Asia		0.038			-0.018	
North America		-0.067***			-0.101	
Oceania		0.078			-0.157*	
Year 2006	-0.018***	-0.019***	-0.019***	0.008*	0.008*	0.008*
Pseudo-R^2	0.1203	0.1212	0.1221	0.1645	0.1653	0.1646
Log-L	-13,792.6	-13,779.3	-13,765.5	-24,407.9	-24384.1	-24405.2
N	49,123	49,124	49,123	49,123	49,124	49,123

Note: The asterisks indicate significance at the 1% level (***) 5% level (**) and 10% level (*)